made good by a *plus* on the other, or that desirable dominants may corroborate one another.

Sterility is such a puzzling phenomenon that any suggestion from competent biologists is very welcome. The authors point out the striking fact that both inbreeding and outbreeding may land the organism in sterility, and they suggest that there may be two quite different kinds of diverse origin. Inbreeding tends to sort out homogeneous pure strains in a stock, and in this sifting the ability to reproduce may be lost. On the other hand, outbreeding may bring together two germ-cells too incompatible in their chromosomal complex to allow of the continuance of the germ-cell lineage. Thus it may be that the number of chromosomes in horse and ass is too discrepant to allow of fertile progeny.

We have to thank the authors for a valuable monograph, embodying the results of many personal experiments and a critical utilisation of material previously available in the work of others. The book is marked at once by independence and by scholarship. Of great interest to many will be the application of the biological results to the particular case of man. There is a carefully selected bibliography, which might have included perhaps a useful work by Reibmayr, "Inzucht und Vermischung beim Menschen" (1897).

Einstein's Exposition of Relativity.

Relativity: The Special and the General Theory. A Popular Exposition. By Prof. Albert Einstein. Authorised translation by Dr. Robert W. Lawson. Pp. xiii + 138. (London: Methuen and Co., Ltd., 1920.) Price 5*s.* net.

A POPULAR exposition of the doctrine of Relativity and what it implies: for this the world has been crying since the astronomers announced that the stars had proved it true. Here is an excellent translation of Einstein's own book; we hasten to it to know the whole truth and nothing but the truth. The reviewer on this occasion should be the man in the street, the man who, with thousands, has been asking, "What is Relativity?" "What is the matter with Euclid and with Newton?" "What is this message from the stars?" Whether it is possible for the prophet to make his message clear to the multitude, only history can prove. He must needs speak largely in parables, in incomplete similes; and he is subject, therefore, to inevitable misunderstanding.

The plain fact is that Einstein asks the world to give up preconceptions, and to change its point of view. Men jump at suggestions of the fourth dimension, which promise some amusement, and room for a play of fancy. But the fourth dimension does not call for a very high flight of imagination; it is not taken very seriously; it is even recognised as a commonplace and somewhat old-fashioned intellectual pastime. A much more serious trouble comes in with the simple concrete instance. A passenger sitting in a train finds himself hurrying towards the other side of the carriage. He remarks that the brakes have been put on and the train is stopping. We are told that he may also interpret his experience thus: "The carriage remains permanently at rest . . . during the period of application of the brakes, the railway embankment, together with the earth, moves non-uniformly in such a manner that their original velocity in the backwards direction is continuously reduced." This seems to upset all the mechanics we had ever learned. For while we had always been carefully taught that the real explanation of the phenomenon lies in the stopping of the train while we ourselves move on uniformly, it is now held to be indifferent whether we adopt this attitude or think of the pressure of the driver's hand on the brake lever as imparting a change of motion to the whole earth and to ourselves—to everything, in fact, except the train. But the plain man feels there is a very real difference, and the ardent mathematician must indeed be living in an abstract world if he does not feel it too.

Here, indeed, is the great virtue of mathematics, that in it one may escape from the tyranny of gross perception. As Prof. Eddington puts it, the mathematician is never so happy as when he does not know what he is talking about. The engine-driver applying the brake does not know what happens either to the train or to the earth; he does know that he has some control over their relative motion. The mathematician does not know, and does not wish to know, what happens to this or that individual thing. He takes that for granted. He asks only what are the relations between events, or rather what can the mind know about them. Here only the genius can make progress. An unshackled imagination and a keen logical sense must combine in the adventure. The human mind has dared to look upon all history in space and time as laid out before it, and having thus overstepped the limits of mortality, it must go back and ask how much of this vision it may, as mortal, know.

At this moment rain is falling, leaves are rust-

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ling, a motor hurries along the road, the clouds are drifting. All is change and motion. It seems that all history is change, and all is hurrying by us as we stand. But is it not a truer view, certainly a less egoistic one, to see history as one eternal whole, and ourselves as voyagers through it, our vision of it ever changing? All our experiments, our measurings and comparisons are themselves part of the great web; we ourselves are part and parcel of it, and must acknowledge our incapacity to put ourselves outside. All our pictures and conceptions of the universe in time and space are but pictures, and the painters are many. There are strange differences between their records of what they have perceived—more, indeed, of difference than of similarity. We go to a picture-gallery; there is so much of difference that at first there seems little in common. Yet gradually we become conscious that the pictures are all drawn from a common life. We begin to be able to analyse the painters, and see what kind of a mind is looking out upon it, to detect a point of view. In so doing we grow more clear as to the one reality behind all the pictures.

This is a true parable of the great change that has been consummated in physical thought by Einstein's work. It is the recognition of the relativity of our space-and-time pictures that has clarified our understanding of the universal phenomena. Gravitation has not been explained. The mystery of it is ten times greater than before. To Newton it was one among many properties of that fundamental mystery "matter." It is almost true now to reverse the order and say that matter is one of the manifestations of the fundamental mystery of gravitation.

The reader of Einstein's exposition will need to ponder hard if he is to get to the heart of the matter. For it is a spiritual adventure upon which he has to embark. The very clarity and simplicity of the book may hide this from the over-confident. The parable may be understood and its meaning lost. But to those who have the vision the world of physics will take on a new and wonderful life. The commonest phenomena become organic parts of the great plan. The rationality of the universe becomes an exciting romance, not a cold dogma. The thrill of a comprehensive understanding runs through us, and yet we find ourselves on the shores of the unknown. For this new doctrine, after all, is but a touchstone of truth. We must submit all our theories to the test of it; we must allow our deepest thoughts to be gauged by it. The metaphysician and he who speculates over the meaning of life cannot be indifferent.

The Cambridge British Flora.

The Cambridge British Flora. By Prof. C. E. Moss, assisted by specialists in certain genera. Illustrated from drawings by E. W. Hunnybun. Vol. iii. Portulacaceæ to Fumariaceæ. Text: Pp. xvi+200. Plates: Pp. vi+191. (Cambridge: At the University Press, 1920.) Price, two parts, 6*l.* 15*s.* net; two parts in one volume, 7*l.* net.

THE previous volume of "The Cambridge British Flora" was reviewed in NATURE of August 6, 1914. Since this review was written many things have happened. Dr. Moss has been appointed professor of botany at the University College, Johannesburg, and has been unable to give personal attention to the volume during its passage through the press. The syndics of the University Press acknowledge valuable assistance given by Mr. A. J. Wilmott, of the botanical department of the British Museum, in correcting proofs and in dealing with questions which are normally settled by an editor. In July, 1918, Mr. E. W. Hunnybun died. A sympathetic note by Mr. Wilmott, at the beginning of the present volume, gives an interesting account of his method of work in preparing the illustrations, which makes clear both its advantages and limitations. The character of the illustrations has been much discussed among British botanists, but it became evident that Mr. Hunnybun could work only on his own lines, the accurate delineation of an individual specimen, and was also unable to supply the botanical details of structure of flower and fruit which, in the opinion of many, would have enhanced the value of the illustrations. As permanence is a consideration in a work of such importance as a standard British Flora, it is surprising to find the plates printed on a chalk-faced paper. Other events have tended to delay the appearance of the present volume, and to cause the serious increase in cost of production, which has necessitated raising the price to nearly three times that of the previous volume. The syndics of the Cambridge University Press must view this addition to their difficulties with grave anxiety, and it is to be feared that many students of our British flora who would wish to possess the book will be unable to meet the increased cost. The critical elaboration of a number of families will be of considerable value should the work fail of completion; but British botanists will feel deeply disappointed if it cannot be carried through satisfactorily.

The families included in vol. iii. are Portul-

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